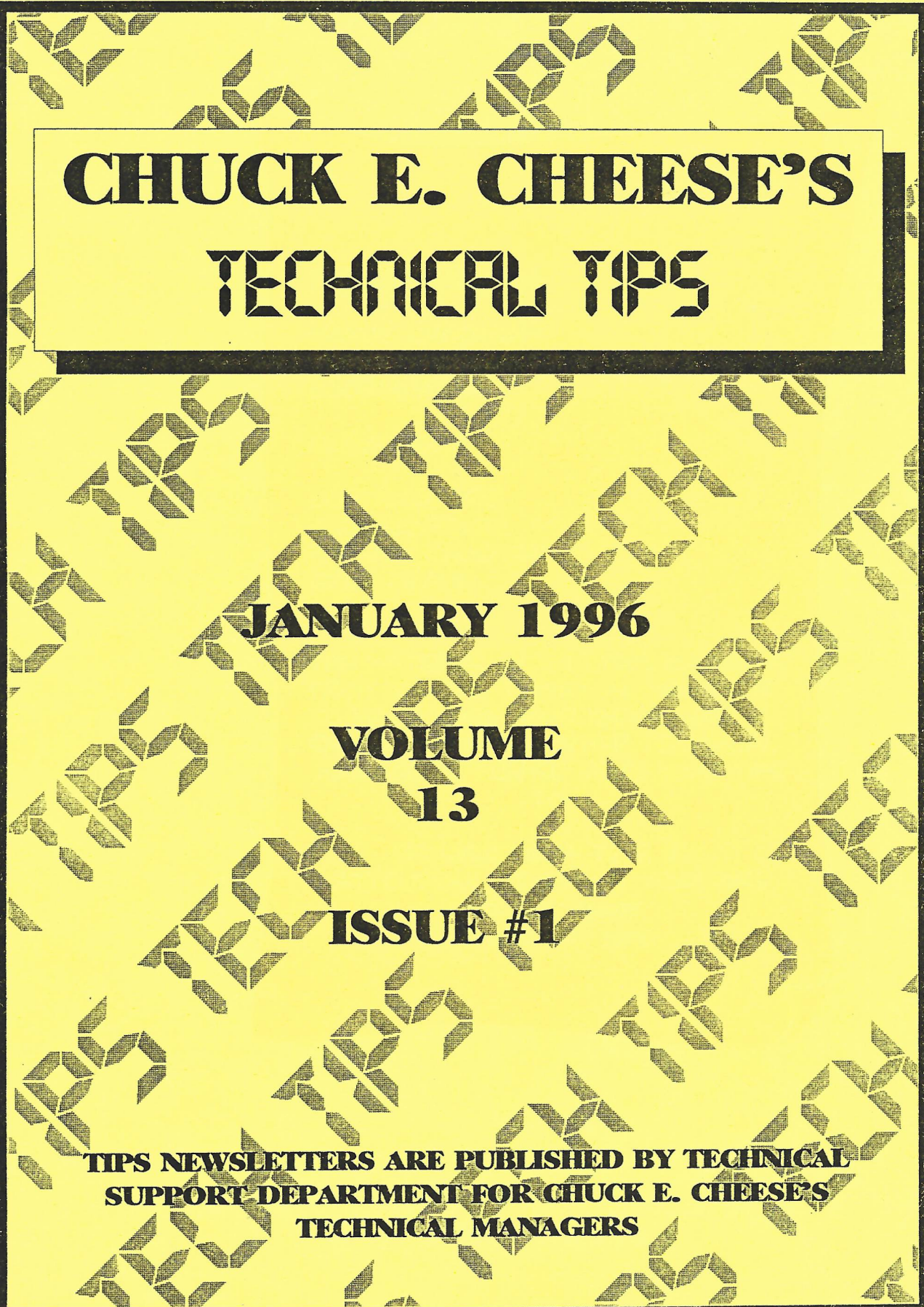




CHUCK E. CHEESE'S TECHNICAL TIPS

JANUARY 1996

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ISSUE #1

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SHARED WITH THE OTHER TECHNICAL
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TO:

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P.O. BOX 152077
IRVING, TX 75015



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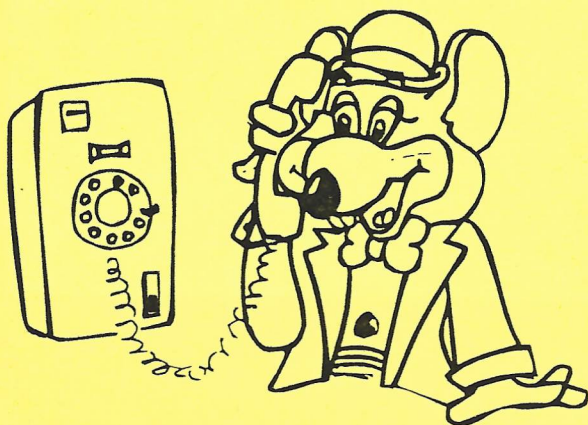
WHAT'S HAPPENING IN THE WORLD OF PARTS



A reminder that the Parts Department has available drop coin mechs at an unbeatably low price of \$8.05 each. When ordering this part, refer to part #GCM-0001.

Also, available are some related replacement part:

Coin Mech Return Springs	GCM-0002	\$2.80 per pack of 10
D Cradles	GCM-0004	\$.50 each

DOYLE GAMES

Doyle and Associates has merged with I.C.E. Therefore, I.C.E. will begin to support any issues with these games. For parts/service all calls should be made to (208) 743-7992 at this time. As this transition evolves, we will keep you informed on any changes. If you have any question, feel free to contact Frank Khoshgam in the Technical Support Department.

EIGHT & TWENTY CIRCUIT TRIAC BOXES (3 STAGE)

Locations with eight & twenty circuit triac boxes should pay close attention to the triac's gate resistor. The gate resistor is a 100Ω $1/4W$ resistor and should not be substituted with any other value resistor. The rule of using a higher watt valve doesn't apply here. A 100Ω $1/2W$ (or higher) resistor is not only not acceptable but potentially destructive. The gate resistor in this circuit is designed to act as a fuse, opening

when there is too much current draw. By substituting a higher wattage resistor, your are increasing in essence the fuse size and I think we all get the picture! If you have any questions, feel free to contact Frank Khoshgam in the Technical Support Department.

**MONITOR REPAIR
WITHOUT SCHEMATICS
(Part 1)**

Here's a great article on monitor repair taken out of the January 96 issue of Star Tech Journal:

The essence of troubleshooting is isolation of the problem. Identify the symptom, what does and does not work. A monitor is a system. **Power goes in, signals go in, pictures come out. It is a process.** Troubleshooting is a linear process as well, in parallel with the system. If we follow the flow of the system, it will lead us to the fault.

Observation

First we must isolate the area of the circuit that has failed, then we find out why. Is it system wide? Is the unit dead? Or is the problem with the sweep? Vertical or horizontal? Complete loss of sweep or partial? Distorted? Video problem? Contrast, brightness, individual color problem? Missing color? One color stuck on full? Answering these questions leads us towards the repair. If we have a missing color, we need not look for a failure in the sweep circuits since sweep affects all colors equally. Is the problem constant or intermittent? Does the symptom occur right away, or does the unit have to warm up first.

Pretest Note

I leave it to the reader to provide proper isolated power to the unit under test and suitable video signal for testing. This could be from your bench setup, or simply from the game the monitor came from.

Observe Safety Procedures

Please be careful working on any monitor. This article assumes basic electronic troubleshooting competence in the reader as well as at least some monitor experience. There are dangerous voltages in any monitor, both high DC voltage and the AC line. Please use an isolation transformer: Always. You already expect high voltages to be present in operating monitors, but a monitor with a blown secondary fuse in the

main DC supply can leave behind a fully charged main filter capacitor, and it can hold that charge for a long time. Don't let it catch you by surprise. Always check with a meter first. Remember to remove your rings and wristwatches before working on a live monitor.

Gather Facts

Any good repair starts with a visual inspection. Look for obvious broken parts or wires. Are there any burnt components? If the flyback transformer is cracked in half, we know it needs to be replaced or the monitor retired. Is the unit mechanically sensitive? Give the chassis a whack with your hand, or tap the PC board with an insulated object (a stick). Does this affect your symptom? If so, you have a bad connection somewhere. Resoldering will likely fix it, I have found several intermittent connections over the years by turning off the lights in the shop, tapping on the board and watching for little sparks at the bad spot. Look on both sides of the board. This won't work often, but it is really impressive when it does.

The Big Three

At this point our approach depends upon the symptom. I sort problems in to three broad categories. The unit blows fuses, the unit doesn't seem to function, or the unit functions however poorly with a problem in some specific area.

MONITOR BLOWS FUSES

Monitors that blow fuses can often be fairly simply repaired. Most problems that cause fuses to blow can be found in two areas of the monitor: The power supply and the horizontal output transistor and transformer circuit. If your monitor has a secondary fuse in the DC supply line, it will tell you where the problem is. If the secondary fuse is blown, then the problem must be farther along in the system, i.e. in the horizontal section. If the horizontal section is bad, check the horizontal output transistor (or HOT) for collector to emitter short or low resistance. The HOT will be a large power transistor very near to the flyback. Flyback transformer and horizontal output transformer are the same thing. Since the emitter almost always is tied to ground, we can usually make the measurement from the transistor case (collector) to the chassis ground. The base drive to the HOT is almost always provided by a transformer with one side to ground. For this reason, we cannot check for base to emitter shorts in-circuit. Also, check resistance to ground at the HOT collector lead with the transistor removed. If still shorted to ground, check for a bad damper diode or a bad cap, especially the four lead "safety" cap some models use. Follow the printed circuit traces from the HOT collector directly to these parts. While you

are at it, check any diode you see in the general vicinity of the flyback. If you replace the HOT, everything else seems OK, and it still takes out fuses or burns up the new HOT, we have to suspect the flyback. If the main fuse blows but not the secondary fuse, then the fault is likely in the power supply.

Power Supplies

If your power supply blows fuses, check your main rectifier(s) and the voltage regulator. The rectifier could be one diode, a bridge of four discrete diodes, or a bridge. Whatever it is, it shouldn't be shorted.

Follow the traces from the rectifier to the main filter capacitor and on to the regulator. The big filters rarely go shorted, they usually just get leaky or open up.

The regulator will be either an IC regulator (which looks like a transistor but may have more legs) or a discrete regulator, which is to say one made up from individual transistors. Anything with a STR number on it is a regulator IC. Check the regulator IC for shorts between input and output, and either of those to ground.

With discrete regulators, a shorted pass transistor usually shuts down a monitor, but often does not blow fuses, but check it anyway. Check the nearby transistors as well. Your

DMM will work fine for this testing, since we are looking for short circuits in the transistor. Keep in mind that some other part of the monitor could have caused the power supply section to fail.

Monitors have AC line filters at the power input to prevent interference. A bad cap here would be right across the AC line. Your fuse problem could be as simple as that.

Iso Problems

If you just built a conversion and the monitor gave out when you powered it up, or if you try to install a slave monitor, especially if you don't use a separate isolation transformer for the slave, and the same thing happens, you may have isolation problems and you can almost count on blown rectifiers and likely some traces burnt off the PC board. Ground traces are at risk, and they will burn out at the narrowest point(s).

Hmmm...I've seen that before

My other problem categories require a more complicated approach. The best tool you have takes no space in your tool box. It is experience. Your experience can help you. Monitors are all pretty similar under the skin, so if something looks familiar, there is some chance that it is what you think it is. When troubleshooting with a schematic, we use it to identify parts so that we might locate them in the unit. In

the absence of diagrams, we use other clues. Though a monitor circuit board looks complex, we are often concerned with only a small part of it at a time, and it is not too difficult to follow the printed circuit traces to make up your own schematic, even if it is just in your head.

Some manufacturers identify power supply traces on the PC board with silk screen hatch marks or a solder stripe down the center of an otherwise coated trace. Learning to trace out your own schematics will be valuable in many ways in your bench work. A little practice makes it fairly easy.

Number Groups

Many brands give different number sequences to each section of the monitor. Part numbers might group horizontal section parts in the 600s, power supply in the 900s, and vertical in the 400s for example. Check the numbers silk screened on the PC board.

You may find not only these number groupings, but on some boards even lines surrounding the various sections with labels like VIDEO, SYNC, VERTICAL, etc. Component types and values can suggest their function.

Electrolytic caps of high voltage rating (160V, 250V) and a value of 10 ufd or more are likely filter caps

or maybe a vertical output cap. Vertical sweep outputs are usually pairs of transistors on heatsinks, or on newer units a multi pin IC for that purpose. The HOT is readily identified, and the only other power semiconductors in most monitors will be the regulator in the power supply and the vertical sweep driver.

References

Look up the part numbers in the ECG or NTE cross reference guide. Not only will the ECG book identify your vertical output IC, but it will provide the pinout as well. That is the function of each pin on the device.

Look up your voltage regulator IC and the book tells you the output voltage to expect. There are three color circuits in any monitor, so when you spot three similar looking circuits side by side on the PC board, you have probably found the video or color circuits.

Similar Prints

Other schematics can be helpful. If you can find another monitor using the same oscillator IC, use that schematic for clues as to what voltages and waveforms to expect on the mystery unit. That will work for circuits close to the IC anyway. Even an unrelated schematic can be helpful to suggest component functions to look for.

Part Two to appear in next issue.
See chart as follows:

Monitor Repair Without Schematics

Points Covered:

Part 1

Intro, troubleshooting philosophy, general approach, cautions. Three types of problems described:

Monitor blowing fuses
T'shooting horiz section
T'shooting power supply

Line filter. Isolation problems. Discussion of approaches to locating and identifying components and circuits.

PC board art
Silk screening
Component types
Literature resources

Part 2

Color/Video problems:

Color gun circuits

CRT

Neck board

Vertical section. General discussion on capacitors: High and low voltage circuit types. Horizontal section. Horizontal deflection -it ain't the yoke. Pincushion.

"Dead" monitor or blank screen: No power. Bad power or poor regulation and associated techniques.

Shutdown: Oscillator techniques.
Heat related problems.

TICKET MECHS MADE EASY



Here is a recent release by Deltronic Labs, Inc. Also, find attached a one page cut sheet on this new product:

Installation For The **QUICK-RELEASE Face Plate**

Our current ticket dispenser has been in use almost a quarter century with minor mechanical changes. The success of our ticket dispenser is unmatched for reliability and simplicity. With the increased use of our unit, came a need for quick serviceability and shorter down time requirements. To this end, we continually look for improvements and new ideas to better our ticket dispenser. We evaluate all of our improvements, however, only the most practical are considered for use. One of many such ideas has come our way, and will be introduced here with. However, it must be said that this idea is part of a greater

application such as:

- A. Field fix application
- B. Incorporated into new units
- C. Standardization across product line

We call this the "QUICK-RELEASE" Face Plate for its function and installation. (See drawings attached). To install QUICK-RELEASE Face Plate, study attached drawing and do the following:

The QUICK-RELEASE Face Plate is complete from the factory and needs only to be installed using (4) screws and Pems in side plates.

Kit part list:

- 1- "QUICK-RELEASE" Face Plate
- 1- .032 Nylon Spacer
- 4- 4-40x1/4 in. PPHMS
- 4- Pem Nut #SO-440-8-Z1

In order to prepare the dispenser, we must remove the existing face plate, this is done by unscrewing (4) screws, on the sides, holding the Face Plate attached to the frame.

IMPORTANT NOTE **SEE DWG. A4795 Attached**

Removing the standard face plate may affect the spacing between the frame plate No. 8, and brake sprag No. 3. After removing front plate, check to see that the sprag No. 3 is

seated flat against the frame plate No. 8. The sprag should be snug, but not tight. (Motor should pivot freely).

Drawing A4795
Description of Parts

Part #	Description
1	Pivot bracket screws
2	Retaining Ring
3	Brake sprag
4	.032 thin nylon washer
5	Set screw (drive roller)
6	Pivot brackets
7	Pivot shaft
8	Frame plates
9	(4) 4-40 Holes
10	Drive roller
11	Pivot bracket spacer block
12	Pems installed

* Note, if any of the following conditions occur, refer to instructions below.

- A. Brake sprag No. 3 falls away from frame plate No. 8.
- B. Brake sprag No. 3 does not engage in drive roller when motor pivots to brake, (i.e. skips).
- C. There is a visible gap between frame plate No. 8 and brake sprag No. 3 (brake side only).

The solution to the above conditions is: adding the .032 nylon spacer No.

4 provided herewith. Begin as follows:

Turn machine over to expose set screw No. 5 and loosen. Slide motor out to left. Loosen (2) screws No. 1 left side, then remove retaining ring No. 2. Pull pivot bracket No. 6 away from shaft No. 7 and add spacer No. 4. Replace No. 6 and No. 2. After checking that block No. 11 is square with frame plates No. 8, tighten screws No. 1. Replace motor (drive roller No. 10 should be against left pivot bracket No. 6 before tightening). Be sure set screw No. 5 is seated on the flat of motor shaft. (Motor and brake should be snug, but not tight). Motor should pivot freely.

Then, install into the (4) screw holes, the (4) Pem Nuts as outlined by the drawing 11394. Start screws in the side plates, then tighten from Hex Pem Nut. Pem Nuts (Part # SO-440-8-Z1) are provided in hardware kit, and are installed HEX SIDE OUT.

Next, see drawing 11-3-94 before attaching frame to face plate. Proceed as follows:

Insert bottom Hex Pem Nuts into bottom slots on face plate. When in that position, frame will hang or hinge. Pivot frame forward to lock face plate. (See Drawing).

Note arrows, saying "To Lock"

direction. Pivot unit forward. Then, push on and down while making sure ticket guides are in ticket slot. Ticket Guides should be seated on frame slots for correct positioning. Also, make certain that the spring is in the proper position. Once this is accomplished, the units should be secured together.

- * Note: When locking face plate, both side plates No. 8 should be **INSIDE** each slot on face plate.

Conversely, repeat the above sequence in reverse. Once unlocked, unit may be left hinging on bottom pins and slots for servicing or simply removed.

- * Note: To remove "Quick Release" face plate, hold dispenser directly under pivot brackets No. 6 and pull straight up to release spring.

INPUT TO TIPS



Attached, please find an input to tips form that should be used when

sending information to the Tech Tips publication. If we use the information sent, your name will appear on the contributors list toward the front of the publication.



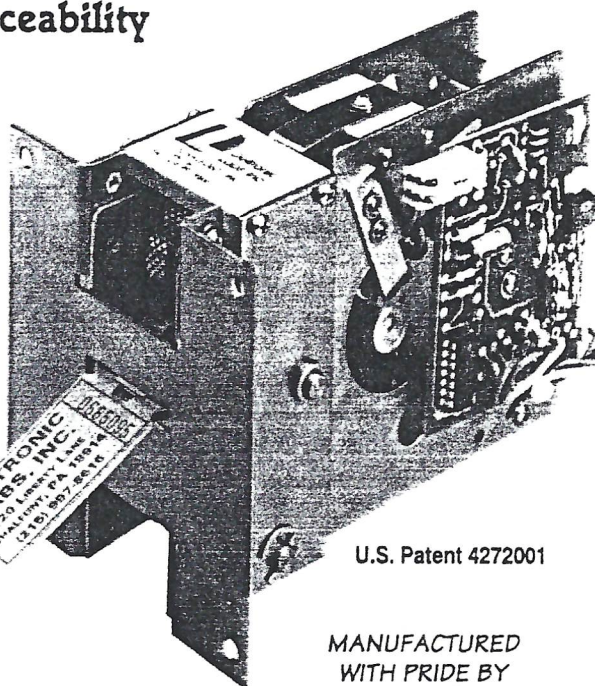
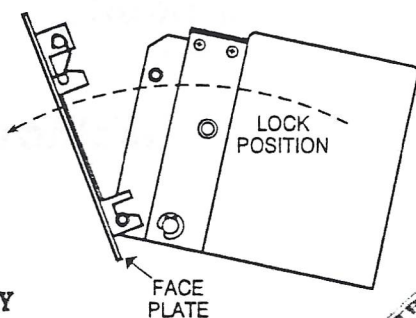
Deltronic Labs, inc. introduces. . .

The "Quick Release" Ticket Dispenser

4 NEW features greatly improve serviceability to reduce downtime - now standard on all new dispensers

1 "Quick Release" face plate

Dynamic, new design allows the ticket dispenser to "quickly release" from it's face plate on your cabinet or ticket door, **no tools** needed. Gives you complete access to front of rollers and ticket guides. Plus, you can "snap out" one ticket dispenser and immediately replace it with another in just seconds. No tools necessary! **The new face plate retrofits any existing Deltronic Labs machine.**



U.S. Patent 4272001

MANUFACTURED
WITH PRIDE BY
DELTRONIC LABS
IN THE USA

2 Bottom METAL ticket guide

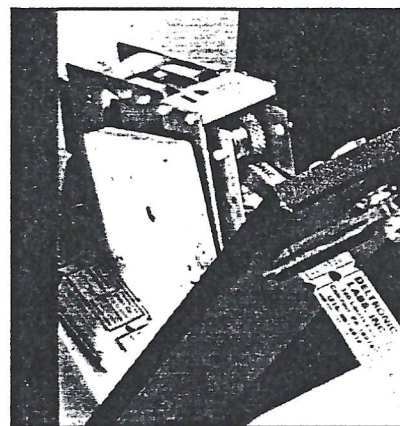
The longer, more durable ticket guide extends through the face plate allowing for better guidance. Plus a larger opening in the face plate prevents curled tickets from catching.

3 Foolproof braking system

Our impressive new braking system **eliminates brake slippage**, allowing foolproof, accurate dispensing. This design also reduces wear and tear on the dispenser caused by misuse. Brake is easily accessible and can be adjusted.

4 Optical sensor dust cover

Now the chance of ticket-dust accumulating on the optical sensor is virtually eliminated. This increases the accuracy of the ticket count, again **reducing maintenance**.



Other - Patents Pending

PLUS. . . these features and specifications

- Low voltage operations: only 12V D.C.
- Solid state output enables interfacing with electronic games
- Compact and lightweight - only 3"W x 4"H x 5 1/2"L and 2 1/4 lbs.
- Validation "Diamond" mark identifies tickets that have been dispensed
- Adjustable ticket stop

- **Fast parts service** - we provide quick shipping from our manufacturing inventory
- **Fast repair service** - most repairs are done in 24 hours
- **On time deliveries** - our reputation is second to none
- **One Year Warranty**



Another quality product from Deltronic Labs . . . the industry leader in ticket dispensers

For information on our complete line of products, please call

Deltronic Labs, inc.

120 Liberty Lane, Chalfont, PA 18914 • 215-997-8616 • FAX # 215-997-9506

INPUT TO TIPS

Name:

Location:

Telephone #:

Problem:

Recommended Fix:

Parts/Materials/Supplier/Cost:

**Please attach schematics, drawings,
pictures appropriate.**